

**METHOD AND SYSTEM FOR FABRICATING A COPPER BARRIER LAYER  
WITH LOW DIELECTRIC CONSTANT AND LEAKAGE CURRENT**

**ABSTRACT**

[0028] A method is disclosed for reducing metal diffusion in a semiconductor device. After forming a first metal portion over a substrate, a silicon carbon nitro-oxide (SiCNO) layer is deposited on the first metal portion. A dielectric layer is deposited over the SiCNO layer, and an opening is generated in the SiCNO layer and the dielectric layer for a second metal portion to be connected to the first metal portion, wherein the SiCNO layer reduces the diffusion of the first metal portion into the dielectric layer.